UNITED STATES PATENT AND TRADEMARK OFFICE

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EXAMINER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

	Application No.	Applicant(s)
Office Action Summary	10/716,622	WATANABE, AKIRA
	Examiner	Art Unit	
	HAROLD A. HOTELLING	2164	

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

> A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS,
> WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
> - Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
>   after SIX (6) MONTHS from the mailing date of this communication.
> - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
> - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
>   Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
>   earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on <u>14 May 2008</u>.

2a) ☐ This action is **FINAL**.   2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
     closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) <u>1 - 17</u> is/are pending in the application.

   4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) <u>1 - 17</u> is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.

   Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

   Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   a) ☐ All   b) ☐ Some * c) ☐ None of:

   1. ☐ Certified copies of the priority documents have been received.

   2. ☐ Certified copies of the priority documents have been received in Application No. _____.

   3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage
        application from the International Bureau (PCT Rule 17.2(a)).

   * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
   Paper No(s)/Mail Date <u>December 7, 2007</u>.

4) ☐ Interview Summary (PTO-413)
   Paper No(s)/Mail Date. _____

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office Action has been withdrawn pursuant to 37 CFR 1.114. The applicant's submission filed on May 14, 2008 has been entered.

Response to Amendment

The applicant filed claim amendments on May 14, 2008.

The rejections under 35 U.S.C. 102 are removed, but replaced with rejections under 35 U.S.C. 103.

Response to Arguments

The applicant's arguments filed May 14, 2008 have been fully considered, but they are not persuasive. The applicant appears to have presented two arguments distinguishing amended independent claims 1, 9, and 17 (effective filing date: November 20, 2002) from Li (U.S. Patent number 6,754,662) (effective filing date: August 1, 2000).

The applicant argues firstly on page 8, lines 2 – 11:

> While the filter entries generated as taught by Li may be analogous to the claimed
> "predetermined conditional statements corresponding to a plurality of information areas
> included in header information of said packet," the act of extracting such information from
> packets to create such filter entries is not the claimed act of searching the predetermined
> conditional statements. In other words, generating filter entries is not a search of filter
> entries. Li later discloses that filter entries are searched, but fails to disclose that the
> results of such search are then searched again by a different search method, as required
> by the independent claims. See Li at col. 4, ll.9-14 (stating, "[t]hese [filter] entires are
> accessed by a hash key index that is generated by a hash function from packet header
> information . . . .").

The examiner agrees with the applicant's belief that "generating filter entries is

not a search of filter entries," and that Li alone does not teach the newly amended

independent claims (effective filing date: November 20, 2002) (assigned to NEC).

The examiner, however, has found a secondary reference that combines with Li

to teach the newly amended independent claims: Kalpathy et al. (published application

2002/0039365) (assigned to Broadcom) (published on April 4, 2002) (hereafter

"Kalpathy").

The applicant argues secondly on page 8, last two paragraphs:

> Li's later teachings show that one search is conducted twice, in two locations
> (i.e., cache 108 and memory 110) for the same information. As taught by Li, the system
> "first attempts to retrieve a classID for a defined [packet] flow corresponding to the
> incoming packet from cache 108 by calculating a hash key (block 304) and using it to
> look up a corresponding entry in cache 108 (block 306). If the classID cannot be found in
> cache 108 (determined in block 308), forwarding engine 102 performs a search on stored
> classification information in memory 110 (block 310)." Li, col. 4, ll.24-30. See also Li,
> Figs. 1 and 3. In effect, Li teaches searching two places for the same thing, in particular,
> searching cache `for a filter entry defining "the corresponding treatment/action that traffic
> should receive," and if the filter entry is not located in cache, searching for the filter entry
> in memory. Li, col. 3, ll.60 - col. 4, ll.39.
>
> Neither search in Li uses the results of the other search "for searching the first
> search results from said first search processing means" as required by the independent

The examiner agrees with the applicant's belief that Li alone does not teach the

newly amended independent claims (effective filing date: November 20, 2002), but has

found a secondary references that teaches **searching the first search results of said**

first search processing means with a second search method that is different from

said first search method: Kalpathy et al. (published application 2002/0039365)

(assigned to Broadcom) (published on April 4, 2002) (hereafter "Kalpathy").

Information Disclosure Statement

The information disclosure statement filed on December 7, 2007 is in compliance

with the provisions of 37 CFR 1.97, 1.98 and MPEP § 609. It has been placed in the

application file and the information referred to therein has been considered as to the

merits.

Status of Claims

Claims 1 – 17 are rejected under 35 U.S.C. 103(a).

35 U.S.C. §103 rejection

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining

obviousness under 35 U.S.C. 103(a) are summarized as follows:

1.   Determining the scope and contents of the prior art.
2.   Ascertaining the differences between the prior art and the claims at issue.
3.   Resolving the level of ordinary skill in the pertinent art.
4.   Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1 – 17 (assigned to NEC) (effective filing date: November 20, 2002) are

rejected under 35 USC 103 (a) as being obvious over Li (U.S. patent number

6,754,662) (assigned to Nortel) (effective filing date: August 1, 2000) in view of Kalpathy

et al. (published application 2002/0039365) (assigned to Broadcom) (published on April

4, 2002) (hereafter "Kalpathy").

With respect to independent claim 1, Li teaches **[a] packet search <u>device</u> that**

performs packet filter search for an inputted <u>packet</u> (column 2, lines 13 – 14: "The

present invention relates to a method and <u>apparatus</u> for classifying data <u>packets</u>."**),**

comprising:

a first search processing means for <u>searching</u> <u>predetermined conditional</u>

<u>statements</u> corresponding to a plurality of information areas included in header

information of said <u>packet</u> with a first search method to generate first search

results (column 4, lines 23 – 27: "Forwarding engine 102 first attempts to <u>retrieve</u> a

classID for a <u>defined flow</u> corresponding to the incoming <u>packet</u> from cache 108 by

calculating a hash key (block 304) and using it to lookup a corresponding entry in cache

108 (block 306)."**); and a second search processing means** (column 4, lines 28 – 30:

"If the classID cannot be found in cache 108 (determined in block 308), forwarding

engine 102 performs a search on stored classification information in memory 110 (block

310).") . . .

Li does not appear to explicitly teach (but Kalpathy does teach) **for searching**

the first <u>search results</u> of said first search processing means with a <u>second</u>

<u>search method</u> that is different from said first search method (paragraph [0022],

lines 10 – 15: "In the scheme illustrated in FIG. 3, the Search Stage Zero accesses the

Cache and performs the first six search cycles. Based on the <u>results of the search</u>

performed by accessing the Cache, the <u>Search Stage One</u> accesses the larger 8K

Table to perform the remaining seven search cycles.").

Li and Kalpathy are analogous art because they are from the problem-solving

area of packet processing. At the time of the invention, it would have been obvious to

one of ordinary skill in the art, having the teachings of Li and Kalpathy before him or her,

to modify the "memory 110" of Li to include "Search Stage One" of Kalpathy because

the combination quickens packet processing.

The suggestion for doing so would have been Kalpathy, paragraph [0022], lines

21 – 23: "An advantage of this pipelined approach is that two lookups can be performed

simultaneously."

Therefore, it would have been obvious to combine Kalpathy with Li to obtain the

invention as specified in claim 1.

With respect to dependent claim 2, Li teaches **[t]he packet search device**

according to claim 1, wherein said <u>first search processing means</u> divides said

packet header information into a plurality of information areas and searches across each search conditional statements structured as <u>binary search trees</u> **for each of said information areas separately** (column 5, lines 54 – 57: "the choice of data structures (i.e. a link list or a <u>binary tree</u> or other structure) may depend on the particular design objective of the <u>packet classifier</u>.")**.**

With respect to dependent claim 3, Li teaches **[t]he packet search device according to claim 2, wherein said second search processing means searches aggregated** <u>search results</u> **of said first search processing means using** <u>Hash</u> **method** (column 5, lines 3 – 6: "RFC process 204 performs a search for the classID using, for example, known Recursive Flow Classification (RFC) techniques, for the arriving packet if the hash look-up fails.") (column 7, lines 33 – 38: "at certain times one or more entries of the hash table in the cache should be selected for removal. This might happen when the cache space consumed by <u>hash</u> entries reaches a certain threshold of the total available cache space, or on a <u>cache miss</u> when there is no free space to add the new search result by RFC in the cache.")**.**

With respect to dependent claim 4, Li and Kalpathy teach **[t]he packet search device according to claim 1, comprising a search** <u>database</u> **for managing each search result of said first** (Li, column 4, lines 9 – 13: "Cache 108 stores a <u>hash table</u> with entries filled by class of service identifiers (i.e. classIDs) for (generally) the most recently detected flows. These entries are accessed by a hash key index that is

generated by a hash function from <u>packet header information</u> . . .") **and second search**

processing means for each of said <u>information area</u> (Kalpathy, paragraph [0022],

lines 13 – 14: "Search Stage One accesses the larger 8K <u>Table</u> . . .") (Kalpathy,

paragraph [0018], line 2: "tables can store <u>address</u> information").

     With respect to dependent claim 5, Li and Kalpathy teach **[t]he packet search**

device according to claim 4, wherein said search <u>database</u> has a plurality of

search <u>keys</u> (Li, column 4, lines 9 – 13: "Cache 108 stores a <u>hash table</u> with entries

filled by class of service identifiers (i.e. classIDs) for (generally) the most recently

detected flows. These entries are accessed by a <u>hash key</u> index that is generated by a

hash function from packet header information . . .") (Kalpathy, paragraph [0018], lines 8

– 9: "a <u>table</u> lookup can be performed to determine which port is associated with

<u>address A</u>.").

     With respect to dependent claim 6, Kalpathy teaches **[t]he packet search**

device according to claim 3, wherein said second search processing means

manages only <u>combinations of search results</u> (paragraph [0059], last four lines: "the

invention is not limited to which entries in the table the Cache is made up of. For

example, the Cache could be made up of entry 5, 256, 300 etc. until all entries in the

Cache are filled").

     With respect to dependent claim 7, Li teaches **[t]he packet search device**

according to claim 1, wherein at least <u>QoS (Qualityof Service)</u> information and

<u>filter</u> information are searched for based on said <u>header information</u> (column 3,

lines 55 – 60: "Memory 110 includes stored information about how different <u>classes of</u>

<u>network traffic</u> are identified and how they are to be treated. Such information can

include SLAs for DiffServ networks, and other <u>filters</u> and parameters for establishing

different levels of <u>Quality or Class of Service</u> for different flows of traffic.").

With respect to dependent claim 8, Li teaches **[t]he packet search device**

according to claim 1, wherein said packet search processing is performed at least

in a <u>router</u> and a <u>firewall</u> (column 3, lines 29 – 33: "FIG. 1 is a block diagram showing

a classification architecture 100 in accordance with one example of the invention. Such

an architecture can be provided in . . . an enterprise access/<u>firewall</u> router, a general

Internet access <u>router</u>, etc.").

With respect to independent claim 9, Li discloses **[a] packet processing search**

<u>method</u> that searches for a packet filter for an inputted <u>packet</u> before performing

packet processing (column 2, lines 13 – 14: "The present invention relates to a

<u>method</u> and apparatus for classifying data <u>packets</u>."**), comprising:**

a first step of <u>searching</u> <u>predetermined conditional statements</u>

corresponding to a plurality of information areas included in header information

of said <u>packet</u> with a first search method to generate first search results (column

4, lines 23 – 27: "Forwarding engine 102 first attempts to <u>retrieve</u> a classID for a <u>defined</u>

flow corresponding to the incoming packet from cache 108 by calculating a hash key

(block 304) and using it to lookup a corresponding entry in cache 108 (block 306).");

and a second step (column 4, lines 28 – 30: "If the classID cannot be found in cache

108 (determined in block 308), forwarding engine 102 performs a search on stored

classification information in memory 110 (block 310).") . . .

Li does not appear to explicitly teach (but Kalpathy does teach) **of searching the**

first search results at said first step with a second search method that is different

from said first search method (paragraph [0022], lines 10 – 15: "In the scheme

illustrated in FIG. 3, the Search Stage Zero accesses the Cache and performs the first

six search cycles. Based on the results of the search performed by accessing the

Cache, the Search Stage One accesses the larger 8K Table to perform the remaining

seven search cycles.").

Li and Kalpathy are analogous art because they are from the problem-solving

area of packet processing. At the time of the invention, it would have been obvious to

one of ordinary skill in the art, having the teachings of Li and Kalpathy before him or her,

to modify the "memory 110" of Li to include "Search Stage One" of Kalpathy because

the combination quickens packet processing.

The suggestion for doing so would have been Kalpathy, paragraph [0022], lines

21 – 23: "An advantage of this pipelined approach is that two lookups can be performed

simultaneously."

Therefore, it would have been obvious to combine Kalpathy with Li to obtain the

invention as specified in claim 9.

With respect to dependent claim 10, Li teaches **[t]he packet processing search method according to claim 9, wherein said** <u>first step</u> **divides said packet header information into a plurality of information areas and searches across each search conditional statements structured as** <u>binary search trees</u> **for each of said information areas separately** (column 5, lines 54 – 57: "the choice of data structures (i.e. a link list or a <u>binary tree</u> or other structure) may depend on the particular design objective of the <u>packet classifier</u>.")**.**

With respect to dependent claim 11, Li teaches **[t]he packet processing search method according to claim 10, wherein said second step searches aggregated** <u>search results</u> **of said first step using** <u>Hash</u> **method** (column 5, lines 3 – 6: "RFC process 204 performs a search for the classID using, for example, known Recursive Flow Classification (RFC) techniques, for the arriving packet if the hash look-up fails.") (column 7, lines 33 – 38: "at certain times one or more entries of the hash table in the cache should be selected for removal. This might happen when the cache space consumed by <u>hash</u> entries reaches a certain threshold of the total available cache space, or on a <u>cache miss</u> when there is no free space to add the new search result by RFC in the cache.").

With respect to dependent claim 12, Li and Kalpathy teach **[t]he packet processing search method according to claim 9, wherein each search result at said first** (Li, column 4, lines 9 – 13: "Cache 108 stores a <u>hash table</u> with entries filled

by class of service identifiers (i.e. classIDs) for (generally) the most recently detected

flows. These entries are accessed by a hash key index that is generated by a hash

function from packet header information . . .") **and second** (Kalpathy, paragraph [0022],

lines 13 – 14: "Search Stage One accesses the larger 8K Table . . .") (Kalpathy,

paragraph [0018], line 2: "tables can store address information") **steps is managed for**

each of said information areas using a search database.

With respect to dependent claim 13, Li and Kalpathy teach **[t]he packet**

processing search method according to claim 12, wherein said search database

has a plurality of search keys (Li, column 4, lines 9 – 13: "Cache 108 stores a hash

table with entries filled by class of service identifiers (i.e. classIDs) for (generally) the

most recently detected flows. These entries are accessed by a hash key index that is

generated by a hash function from packet header information . . .") (Kalpathy, paragraph

[0018], lines 8 – 9: "a table lookup can be performed to determine which port is

associated with address A.").

With respect to dependent claim 14, Kalpathy teaches **[t]he packet processing**

search method according to claim 11, wherein said second step manages only

combinations of search results (paragraph [0059], last four lines: "the invention is not

limited to which entries in the table the Cache is made up of. For example, the Cache

could be made up of entry 5, 256, 300 etc. until all entries in the Cache are filled").

With respect to dependent claim 15, Li teaches **[t]he packet processing search method according to claim 9, wherein at least <u>QoS (Qualityof Service)</u> information and <u>filter</u> information are searched for based on <u>header information</u> in said packet** (column 3, lines 55 – 60: "Memory 110 includes stored information about how different <u>classes of network traffic</u> are identified and how they are to be treated. Such information can include SLAs for DiffServ networks, and other <u>filters</u> and parameters for establishing different levels of <u>Quality or Class of Service</u> for different flows of traffic.")**.**

With respect to dependent claim 16, Li teaches **[t]he packet processing search method according to claim 9, said packet search processing is performed at least in a <u>router</u> and a <u>firewall</u>** (column 3, lines 29 – 33: "FIG. 1 is a block diagram showing a classification architecture 100 in accordance with one example of the invention. Such an architecture can be provided in . . . an enterprise access/<u>firewall</u> router, a general Internet access <u>router</u>, etc.")**.**

With respect to independent claim 17, Li discloses **[a] program for a <u>packet processing</u> search method that searches for a packet filter for an inputted packet before performing packet processing, causing a <u>computer</u> to execute** (column 10, lines 18 – 20: "the present invention can improve <u>packet classification</u> for long-lived flows such as streamed multimedia data, Web cache <u>server</u> based traffic, . . ."),

first processing that <u>searches predetermined conditional statements</u> corresponding to a plurality of information areas included in header information

of said _packet_ **with a first search method to generate first search results** (column 4, lines 23 – 27: "Forwarding engine 102 first attempts to retrieve a classID for a defined flow corresponding to the incoming packet from cache 108 by calculating a hash key (block 304) and using it to lookup a corresponding entry in cache 108 (block 306).")**; and second processing** (column 4, lines 28 – 30: "If the classID cannot be found in cache 108 (determined in block 308), forwarding engine 102 performs a search on stored classification information in memory 110 (block 310).") **. . .**

Li does not appear to explicitly teach (but Kalpathy does teach) **that searches the first** search results **of said first processing with a** second search method **that is different from said first search method** (paragraph [0022], lines 10 – 15: "In the scheme illustrated in FIG. 3, the Search Stage Zero accesses the Cache and performs the first six search cycles. Based on the results of the search performed by accessing the Cache, the Search Stage One accesses the larger 8K Table to perform the remaining seven search cycles.")**.**

Li and Kalpathy are analogous art because they are from the problem-solving area of packet processing. At the time of the invention, it would have been obvious to one of ordinary skill in the art, having the teachings of Li and Kalpathy before him or her, to modify the "memory 110" of Li to include "Search Stage One" of Kalpathy because the combination quickens packet processing.

The suggestion for doing so would have been Kalpathy, paragraph [0022], lines 21 – 23: "An advantage of this pipelined approach is that two lookups can be performed simultaneously."

Therefore, it would have been obvious to combine Kalpathy with Li to obtain the invention as specified in claim 17.

Conclusion

The prior art made of record, listed on form PTO-892, and not relied upon, if any, is considered pertinent to the applicant's disclosure.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Harold A. Hotelling whose telephone number is (571) 270-1293. The examiner can normally be reached between 7:00 a.m. - 5:30 p.m. Monday through Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Charles Rones, can be reached at (571) 272-4085. The fax phone number for the organization where this application or proceeding is assigned is (571) 270-2293.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

USPTO Customer Service Representative or access to the automated information

system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

                                        Harold A. Hotelling
                                        Examiner
                                        Art Unit 2164

HAH
July 17, 2008
/H. A. H./
Examiner, Art Unit 2164

/Charles Rones/
Supervisory Patent Examiner, Art Unit 2164